A HEALTH EDUCATION MODULE ON OSTEOPOROSIS FOR YOUNG ADULT FEMALES: IMPLICATIONS FOR ADVANCED PRACTICE NURSES

Scholarly Project for the Degree of M. S. N.

MICHIGAN STATE UNIVERSITY
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1999

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By

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A Scholarly Project

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER of SCIENCE DEGREE IN NURSING

College of Nursing

1999

ABSTRACT

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Osteoporosis is recognized as a major public health problem facing aging individuals. Given the magnitude of the problem and the implication for health care in the future, the only cost-effective approach is prevention. Young adulthood is a potentially significant time to reach young adult females at risk of developing osteoporosis and to promote behavioral changes to positively affect bone density. A health education module has been designed for this population with the goal of increasing knowledge about osteoporosis and risks for development of the disease. Individuals within this population will have an opportunity to examine personal perceptions about osteoporosis, personal risk factors for the disease, prevention strategies, and lifestyle changes. Three, two hour sessions consisting of lecture, small group discussion, group interaction, outside assignments and implementation of learned skills are included. Examples of practice, research and education implications for advanced practice nurses are discussed.

ACKNOWLEDGMENTS

This project would not have been possible without the assistance of my scholarly project committee. I would like to thank my Chairperson Joan Wood R.N., Ph.D who has the amazing ability to provide suggestions that change an acceptable sentence into a clear, concise expression of thought. I would also like to thank my committee members, Georgia Padnu R.N., PhD and Brigid Warren R.N., MSN, for their enthusiasm for the topic, support and encouragement throughout the process of developing this project. I also want to thank my partner Don and my friend Denise. They have both provided a listening ear and unending support.

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Introduction

Osteoporosis is defined as a disease characterized by decreased bone mass and micro-architectural deterioration of bone leading to an increased susceptibility to fragility and increased risk for fracture (Ross, 1996; National Osteoporosis Foundation, 1998). Osteoporosis is one of the most prevalent chronic health conditions affecting over 25 million American men and women; however, women are six times more likely to be affected than are men (Blalock, et al., 1996). After age 65, osteoporosis contributes to 1.3 million fractures in the United States each year. The cost of hip fractures alone exceeds $10 billion and accounts for three to five percent of all Medicare expenditures each year. The actual burden of osteoporosis goes beyond the actual fractures; it results in disability, loss of independence, chronic pain and death (Yawn & Lydick, 1996). According to Yawn and Lydick, "the lifetime risk for a woman to suffer an osteoporotic hip fracture is greater than her combined risk of breast, ovarian and endometrial cancer."

Low bone mass, a major feature of postmenopausal osteoporosis, is the primary determinant of fracture risk. Because of the personally devastating and socially expensive costs of osteoporosis, prevention is important. Fortunately, bone mass can be measured, preserved and increased with therapeutic interventions (Hodgeson & Johnston, 1996). Peak bone mass is reached by the age of 30. An individual's bone

density is influenced by diet and exercise, as well as individual genetic information; it is theorized that influencing this peak bone density will potentially decrease the incidence of osteoporosis in the future (Recker et al., 1992; Renfro & Brown, 1998).

Statement of the Problem

Osteoporosis is now recognized, from an epidemiological viewpoint, as one of the major public health problems facing postmenopausal women and aging individuals of both genders. Osteoporosis is a worldwide problem that will reach epidemic proportions if preventive steps aren't taken now. The most compelling demographic characteristic related to osteoporosis, is the aging population. Given the magnitude of the problem, the only cost-effective approach is prevention (Riggs & Melton, 1995; Barrett-Connor, 1996).

Young adulthood is a potentially significant time to be reaching people at risk of developing osteoporosis in the future. Many young women believe that it is unlikely that they will develop osteoporosis and that osteoporosis is less serious than other common causes of morbidity and mortality, including heart disease, breast cancer, acquired immune deficiency syndrome and Alzheimer's disease (Kasper, Peterson, Allengrante, Galsworthy & Butin, 1994). The visible outcomes of osteoporosis, which include alteration of appearance and alteration in functional ability and pain, are the most likely signs and symptoms to alter or persuade a young woman to change her beliefs about her risk for

osteoporosis (Klohn & Rogers, 1991). This information about altering perceptions provides a bridge for communication when considering the developmental tasks of individuals in this age group.

The developmental tasks of late adolescence (18-25 years) and young adulthood (26-30 years) include accepting responsibility for the self (Block & Nolan, 1986). According to these authors, these two developmental stages provide opportunities for individuals to initiate and engage in activities that promote good health and maintain an optimal level of wellness. Thus, these developmental stages present an optimal time to provide interventions that educate young female adults about osteoporosis and potentially influence the life style choices that will affect their future health. The goal is to preserve positive behaviors and beliefs and/or influence attitudes and beliefs toward positive health behaviors.

Purpose and Significance of Scholarly Project

This scholarly project describes the development of an education module on the topic of osteoporosis for use by advanced practice nurses (APNs). APNs can use this module with young female adults between the ages of eighteen and 30 and thus assist young adult females to prevent the development of osteoporosis. APNs, by virtue of the range of settings in which they practice, their expertise, and their focus on health promotion and illness prevention are in a perfect position to

utilize this module to provide education about osteoporosis and support lifestyle changes of young women.

Literature Review

The review of the literature includes current research on osteoporosis prevention and young women, information on risk factors for the development of osteoporosis, as well as current educational offerings on the topic of osteoporosis. The role of the APN as an educator is explored and resources on the topic of program development are discussed.

Osteoporosis Prevention and Young Women: The Role of Diet and Exercise

According to the report, Healthy People 2000 (1990), it is important for adolescents and young adults to prevent the development of chronic disease by incorporating health promotion behaviors that are part of a healthy lifestyle. This means that education about risks to health is important and according to this report, programs for adolescents and young adults must go beyond education and include in-depth counseling and support.

In 1992, Recker et al. reported on a longitudinal prospective study on bone gain in young adult women. They followed 156 women for five years who did not consciously implement life-style interventions. They found that an increase in bone mass occurred over the entire skeleton until the age of 30 years and that this bone mass was enhanced by

increased self-selected calcium intake and increased self-selected physical activity. In addition, they demonstrated improvement in bone mass related to oral contraceptive use. The findings of this study suggest that "young women might be able to reduce the risk of fracture in their elderly years with relatively minor changes in their life style earlier in life" (Recker et al., 1992, p.2407). Additional study will need to evaluate the long-range effect of oral contraceptive use.

While this study suggests that even minor changes in life style, i.e., a self selected increase in weight bearing exercise and/or calcium intake, can improve bone mineral density (BMD), cross-sectional studies of young adults show greater bone mass in athletes than in age and sex-matched non-exercising controls (Sinaki,1989). These findings are supported by studies that demonstrated that the BMD of female university students correlated positively with the degree of their current and past levels of exercise (Teegarden et al., 1996). The differences in BMD were less impressive between recreational exercise participants and non-exercising controls (Aisenbrey, 1987).

In a meta-analysis of randomized clinical trials on exercise for female osteoporosis, it was concluded that these studies strongly support the view that regular exercise programs are effective in preventing or treating osteoporosis. However, further trials are needed to closely define the optimal exercise treatment regimen (Ernst, 1998). In a study on high-impact exercise and well-trained female college-age

athletes, Taafe, Robinson, Snow and Marcus (1997) demonstrated that striking increases in BMD occur even in individuals with already high BMD measurements. This ability to increase bone mass significantly during the third decade of life offers the prospect of greater safety margins against age-related bone loss in later life and that habitual physical activity is a predictor of bone acquisition for women during the third decade.

According to Anderson, Rondano, and Holmes (1996), bone consolidation continues in females after growth in height ceases. Therefore, an adequate supply of dietary calcium is necessary for calcium accumulation in the skeleton. Calcium intake during the adolescent and young adult stages correlates highly with increased bone mineral density (BMD) of women in their 30's. Studies indicate that about 85% of adolescents fail to reach the recommended intake of calcium (Agostoni, Rottoli, Trojan & Riva, 1994). Modification of adolescent health habits are notoriously difficult to achieve, but when females reach adulthood, around age 20, they appear to be more open to improving their health behaviors (Anderson et al., 1996). Although early childhood and adolescence are the optimal time to increase BMD, it is not too late to increase BMD if young adults implement and maintain preventive measures.

Risk factors for osteoporosis

Osteoporosis is one of the most prevalent diseases of aging. It

affects more than 25 million people in the United States; 80% are women. According to the National Osteoporosis Foundation (1995), the annual incidence of osteoporotic fractures among women in 1991 were more than 1 million. When a woman enters her fifth decade of life, she has a 40% chance of experiencing an osteoporotic fracture during her remaining lifetime (Turner, Fu, Taylor & Wang, 1998). Common risk factors for the development of osteoporosis are known. Many of these risk factors are related to lifestyle and are either preventable or treatable (Renfro & Brown, 1998).

According to Renfro and Brown (1998), all women are at risk regardless of racial identity. However, caucasion and Asian women are at increased risk because they have an increased likelihood of developing low bone mass due to genetic factors which predispose them to lower body weight and smaller bone structure (Hodgson & Johnston, 1996). In general, women with low body weight and bone mass, regardless of race are at risk for the development of osteoporosis (Hodgeson & Johnston, 1996; Renfro and Brown, 1998).

Along with genetic information that relates to race, body size and bone structure, other issues related to heredity are risk factors for the development of osteoporosis. According to Renfro & Brown (1998), young women whose mothers have a history of vertebral fractures also seem to have reduced bone mass and therefore an increased risk of developing this disease.

The National Osteoporosis Foundation (1994) has identified several lifestyle issues as risk factors for the development of osteoporosis. These lifestyle concerns include cigarette smoking, consuming too much alcohol, inadequate intake of calcium and vitamin D, and a sedentary lifestyle with little or no weight-bearing exercise (Renfro & Brown, 1998). In a study by Pocock et al. (1989), muscle strength, physical fitness and weight appear to exert independent effects upon bone mass. They noted that age effects on BMD may be mediated indirectly through associated changes in these other factors.

Current Offerings in Osteoporosis Education for Young Adult Females

While there is a great deal of information in the literature on the topic of osteoporosis and the need for prevention, there is a paucity of information on actual instruction or educational information for this age group. Weiss & Sankaran (1998) described a health initiative that was the result of the National Institute of Health's (NIH) 1994 Consensus Conference on Optimal Calcium Intake. Strategies outlined during this conference included developing health education materials and programs for high-risk groups, and the use of mass media and health care professionals to distribute information about calcium intake. The authors developed an osteoporosis education campaign using nursing students as peer educators. This type of program meets the objectives of providing education to a high-risk group (college-age women) while allowing nursing students to gain valuable experience and expertise in health

education. The program content suggestions included: (a) statistics on disease prevalence, (b) risks, causes and health losses caused by osteoporosis, (c) the importance, effectiveness and ease of adopting osteoporosis prevention strategies, (d) specific, beneficial life style choices, and (e) barriers that may hinder the adoption of preventive behaviors (Weiss & Sankaran, 1998).

In Osteoporosis: A Curriculum Guide, Tresolini et al.(1996) describe an approach to prepare health care professionals to teach students how to work with patients in order to prevent, treat and manage osteoporosis. This guide is an excellent source for information, teaching techniques, and educational projects. The guide's target audience is health professionals, not young women.

APN as Educator

Certain characteristics and role requirements are necessary for advanced nursing practice. These characteristics and requirements allow the fulfillment of the nursing profession's goal of optimizing the health and well being of individuals, families, groups, communities and society (Davies & Hughes, 1995). According to these authors, the areas of competence essential for advanced nursing practice are clinical expertise, critical thinking and analysis, clinical judgement and decision making, leadership and management, communication, problem solving, collaboration, education and research, and program development. Fenton and Brykczynski (1993) delineate the teaching/coaching function of

nursing, first identified by Benner (1984), to include teaching self-care and making health and illness approachable and understandable.

Taking the ideas of these authors further, the development and implementation of programs in response to identified needs is an important part of the care provided by the APN. The process of identifying and responding to identified needs, whether those of an individual, a family or a community, is a function of the APN and also the first step in the process of program development.

Development of an Education Module

According to Lorig et al. (1996), putting a health education program together is "a little like being a juggler", i.e., you have to keep a lot of balls in the air at the same time. The first step is assessment, followed by planning, implementing and evaluating. These are also the four steps of the nursing process. The business literature also addresses the development of seminars, training programs and workshops in the same manner, i.e., assessment, planning, implementation and evaluation (Davis, 1979; Angus, 1993).

According to Lorig et al. (1996), the planning phase, the second step, includes setting objectives. The purpose of objectives is to clarify what the program is trying to accomplish and how it will guide the evaluation process. Typically, standards are used to evaluate the program or module. This planning process includes decisions and choices about education methods and techniques, e.g., choices of media

and possible assignments or activities for the participants.

Selecting, evaluating and preparing materials are additional components of the planning phase. Questions to consider include: (a) How will the education module be utilized? (b) Who will be teaching this health education module? (c) Will the information be presented in a single session or multiple sessions? (d) Will the sessions be on the same day, as in a seminar format, or on sequential days, as in an ongoing class? (e) Are the materials suitable for the target audience? (f) What kind of physical space is required? (g) What expenses exist and how they will be financed? and finally (h) What tools will be used to measure the outcomes? (Lorig et al., 1996; Angus, 1993; Silberman, 1996).

There is a vast amount of material available on the topic of osteoporosis. These materials vary in terms of length, scope and target audience. Tresolini et al. (1996) evaluated osteoporosis patient information issues and concerns by stage of life. Their discussion focuses on the selection of topics, as well as materials selection for education modules about osteoporosis at various stages of life, including young adults.

An important recommendation by Lorig et al. (1996) is that good health education doesn't just happen, but is planned and theory based. Theories and conceptual models don't tell us exactly what to do and they don't necessarily work in all situations; they serve as guidelines for practice.

Conceptual Model

Knowles' Adult Education Theory and Its Application

Adult learners learn differently than children; they are more problem oriented (Schlomer, Anderson & Shaw, 1997). Adult learners are self-directed regarding initiative, intentions, choices, energy and responsibility. They draw from past experiences and life-stage developments (Schlomer et al.). Since this project addresses young adults, adult learning theory, as proposed by Knowles (1990), has been selected as the framework for the development of this project's product, an education module. According to the discussion by Block and Nolan (1986) the developmental stages of late adolescence and the young adult are key periods for individuals to formulate life philosophies and health behaviors, as well as to stabilize their self image. Using the Adult Learning Theory of Malcolm Knowles supports these developmental tasks by encouraging and stimulating self-concept, a sense of responsibility, self-exploration of internal motivators, and identification of barriers that prevent growth and learning. This educational theory treats adults as adults and is a developmentally sound approach to creating an education module for young adults. This learning theory is composed of the six principles of androgogy, the art and science of helping adults learn. However, Knowles did not develop a visualization of his theory. Thus, for the purpose of this scholarly project, a model depicting Knowles' principles of adult learning, as visualized and

created by Zylstra (1998), is used (see Figure 1). An adapted model specifically illustrating the application of Zylstra's conceptualization for an osteoporosis education module is presented in Figure 2. Each principle of Knowles' learning theory is described and related to APN practice.

1. Adults "need to know" the importance of why they need to learn something before they undertake to learn it. An education module aimed at adult learners will have to include information that identifies the importance of the information to the learner. This "need to know" provides the perfect opportunity for the APN to use educational materials that assist the young female adult to understand and evaluate the information about osteoporosis and her risk for developing this chronic illness. Due to the long delay of time between optimal prevention and actual development of osteoporosis, assisting the young women to make this connection will be a key component of a health education module.

2. Adults have a self-concept of being responsible for their own decisions and lives. An adult's 'readiness to learn' is associated with life stage and tasks. Decisions to be healthy and to engage in healthy activities can fit into the young adult's growth in personal

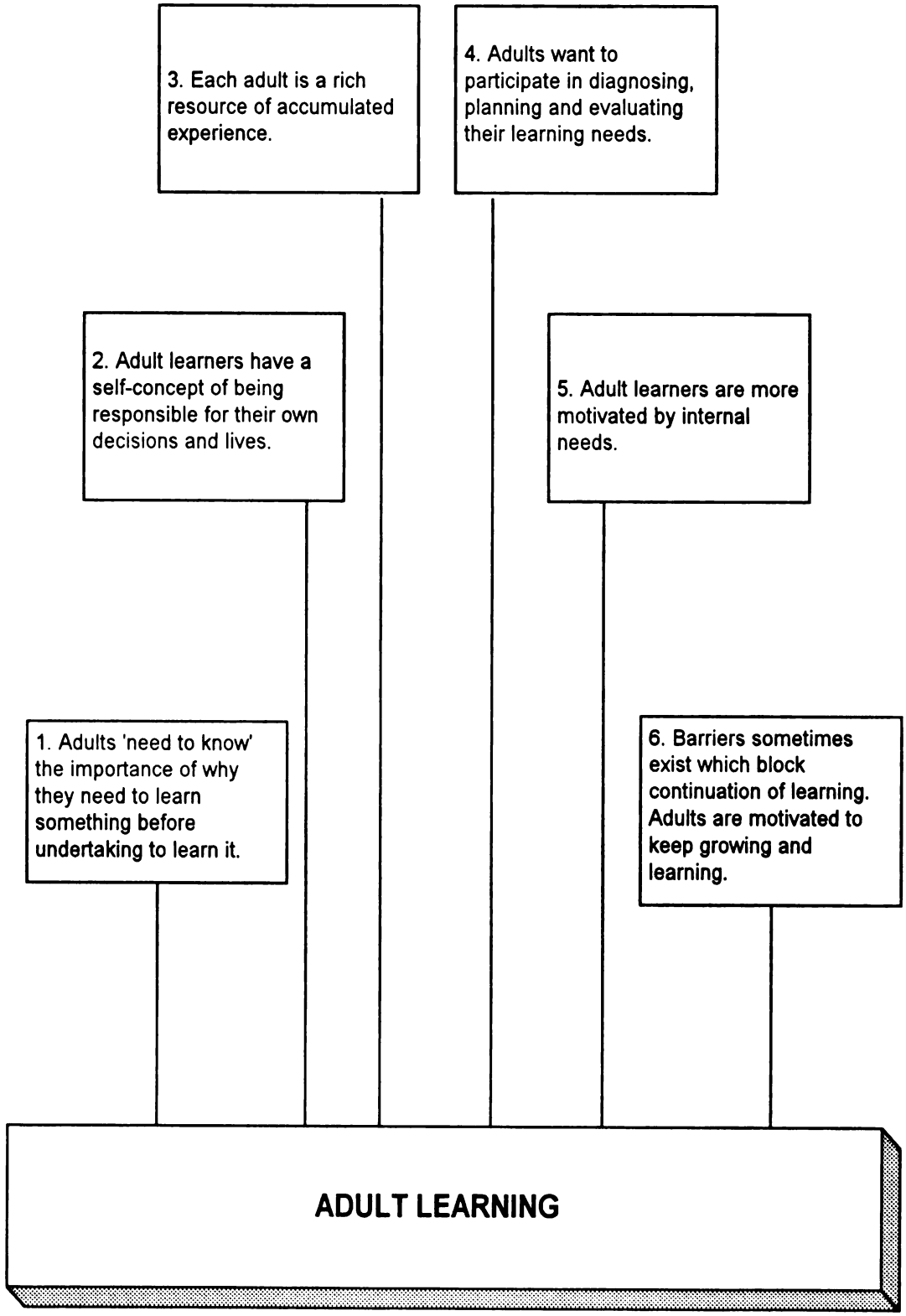

Figure 1 - Knowles' (1990) Priniciples of adult learning as visualized by L. Zylstra (1998)

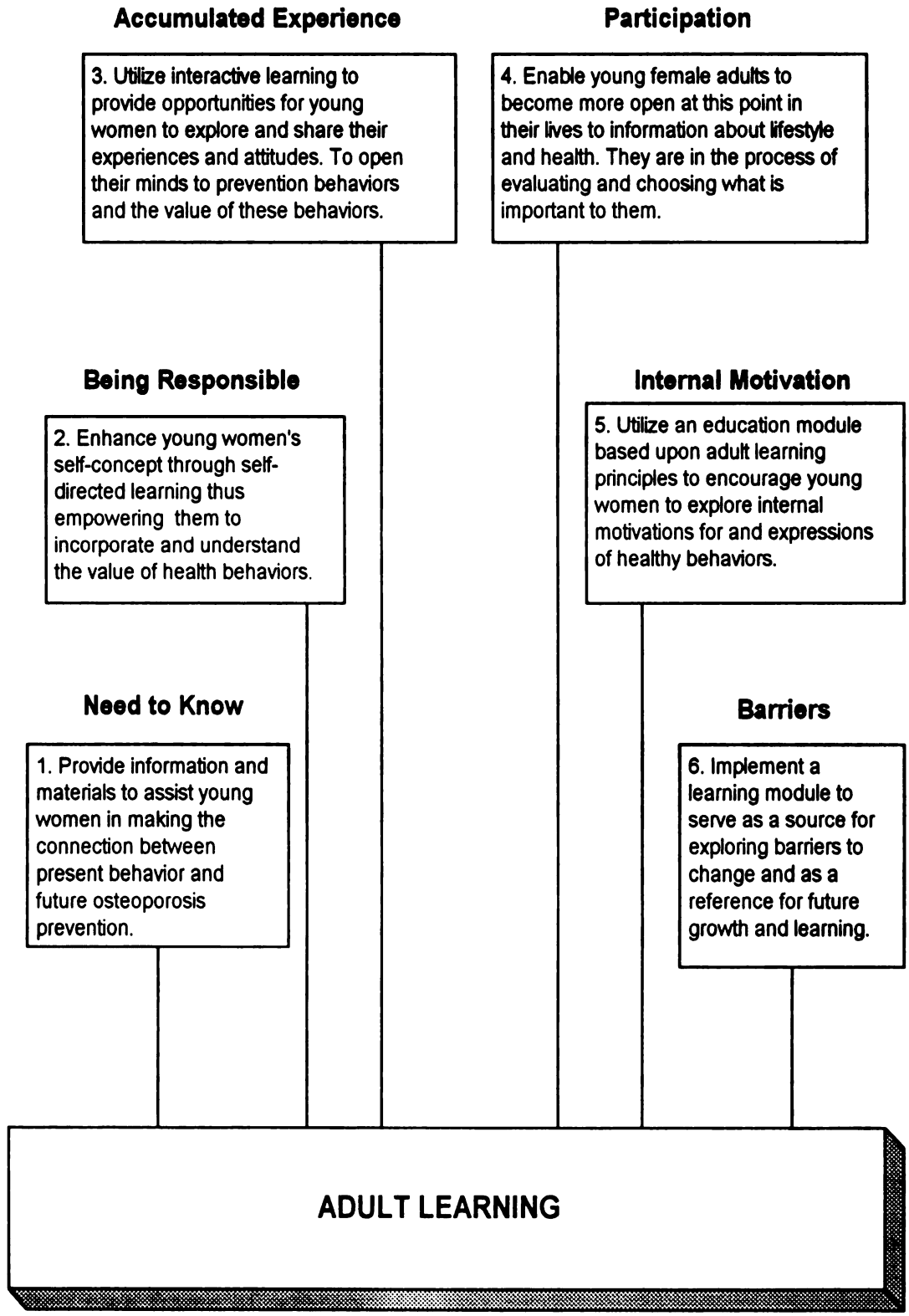

Figure 2 - Knowles' (1990) Priniciples of adult learning
as applied to an osteoporosis education module for young adult females.

responsibility. As discussed previously, these two tasks are part of the developmental stage of the young adult. The first is the process of separating from the family unit as a dependent member, and the second is becoming independent and assuming responsibility for one's own decisions and choices in life. This is also the time when an individual consolidates those activities that promote good health and maintains an optimal level of wellness (Block & Nolan, 1986). Being aware of the developmental tasks of this age group provides direction for the APN in planning interventions and providing materials that support the young adult's efforts to accomplish these developmental tasks that relate to personal health care choices and responsibility for these choices.

3. An adult has an accumulated reservoir of knowledge and experience that is a resource for new learning. Even the youngest young adult has experiences and knowledge to draw from that need to be acknowledged and incorporated into an education module that addresses the topic of osteoporosis. The APN can utilize this resource by working with small groups of young adults. By promoting the value of their resources and experiences and allowing them to share with others, the APN reinforces the validity of their experience and provides the opportunity for others to then share and incorporate the experiences of others into their own frame of reference.

4. Adults want to participate in diagnosing, planning and evaluating their learning needs. This education module needs to include a variety of methods for learning the material, i.e., self-assessment, evaluation tools, and selected activities that provide opportunities to explore the topic of osteoporosis prevention. Problems associated with the traditional classroom/lecture format include (a) a decrease in student attention, (b) it appeals only to auditory learners, (c) it assumes that all students need the same information and at the same pace, and (d) adult learners tend not to like it. In addition, adding audiovisuals to a lesson increases retention from fourteen to thirty-eight percent (Silberman, 1996); consequently, audiovisual materials need to also be included. Active learning, as discussed by Silberman (1996) and Knowles (1990), seeks to engage the mind. The brain isn't simply a receptacle of information; it is an information processor. The opportunity to carry out this processing is enhanced by discussing the information with others. An education module also needs to include opportunities for these young adult learners to discuss and explore the information with each other. The APN can include educational methods that encourage active learning.

5. Adult learners are more motivated by internal needs. This suggests that adults' perceptions can increase their ability to perform tasks or deal with real life problems rather than simply responding to external pressures to learn something. It is not enough to tell an adult that they

should do something or to even have them practice a behavior without providing opportunities to explore ways to incorporate these behavior changes into their lives (Merriam, 1996; Knowles, 1990). Tresolini et al. (1996), in their discussion of learning issues, include not only basic information for young adults but also information on how to cope with changing dietary needs or incorporating exercise into busy life styles. The APN can encourage young female adults, through active learning techniques, to make changes in their lives and to understand and value these kinds of health behaviors.

6. Barriers sometimes exist which can block the continuation of learning. Adults are motivated to keep growing and developing. In a health education module, the APN can capitalize on this fact by encouraging and providing resources for participants to continue to learn more and grow through the use of references and materials that will allow young adults to continue to mature and explore their lives and the possibilities. Osteoporosis is primarily a disease of age and primary prevention of this disease is the focus of this education module. Therefore, it is imperative for the APN to assist young female adults in identifying, exploring and devising strategies that deal with barriers to continued learning and behavior changes.

Conceptual and Operational Definitions

Several terms and phrases are examined conceptually and specific operational definitions for this project are defined. These terms and

phrases are osteoporosis, health education module, advanced practice nurse, and young adult female.

Osteoporosis refers to a disease characterized by decreased bone mass and micro-architectural deterioration of bone which leads to an increased susceptibility to bone fragility and increased fracture risk (Ross, 1996; National Osteoporosis Foundation, 1998). For the purpose of this project, osteoporosis includes this definition, but also is described as a disease that is preventable through known interventions and health behaviors.

Health education module is any set of planned educational activities designed to improve an individual's health behaviors and /or health status (Lorig et al., 1996). For the purpose of this scholarly project, a health education module is defined as an educational program for young adult females, which educates about osteoporosis and promotes health behaviors that can potentially prevent the development of osteoporosis as these young women age.

Young adult female refers to a wide variety of age ranges. Due to the documented possibility to increase bone density till the age of 30 (Renfro & Brown, 1998), and considering graduation from high school as an official transition to adulthood, young female adult is defined as women between the ages of 18-30 years of age who could potentially benefit from this education module.

Advanced practice nurse (APN) is an umbrella term used to describe the various roles in nursing, particularly the certified nurse specialist (CNS), the nurse practitioner (NP), the nurse midwife and the nurse anesthetist (Davies & Hughes, 1995). For the purpose of this project APN refers to a registered nurse with advanced education at the masters degree level who is involved in health promotion and illness prevention in a primary care setting (Rankin & Duffy-Stallings, 1990; Davies & Hughes, 1995).

Health Education Module Development

The proposed health education module for young adult females on osteoporosis is evidence based per the previous literature review, and utilizes Knowles' (1990) principles of adult learners. It includes the following components: (a) learning objectives, (b) the major content areas for the module, (c) implementation and organizational issues, (d) selection of materials and (e) evaluation. It is the intent of this author that this health education module may be altered to fit a variety of situations, but that the content and the rational for inclusion of the various components of the module will be consistently utilized across settings.

The health education module is divided into three sessions of two hours each. Each session is organized around a specific goal and learning objectives. Although there is no single "right" way to sequence an educational program or curriculum (Alspach, 1995), there are several

basic organizational approaches that may be followed. These include moving from (1) the known to the unknown, (2) the simple to the complex, or (3) the concrete to the abstract. This module primarily utilizes the third approach, i.e., moving from concrete information to an abstract application. This approach compliments the broad goal of the module, which is to provide basic information about osteoporosis and risk and to have the participants take this concrete information and apply it to their own life situations.

This health education module has been planned with ongoing evaluation. According to Lorig et al. (1996), in planning a good program you must consider evaluation early on in the process because it helps clarify the goals for the program. The most important part of any evaluation is asking the right questions. A general framework has been suggested by Lorig, et al., which has been used to guide the planning and evaluation process for this project: (1) Knowledge: Did the participants learn what you wanted them to learn? (2) Behaviors: Are participants doing what you want them to do? (3) Attitudes and beliefs: Have the participants' beliefs or their confidence about their ability to alter their behavior changed?

Since adult learners are motivated to continue learning and growing (Knowles, 1990), healthy lifestyle behaviors known to improve bone health will be explored and participants will have the opportunity to consider how these behaviors can be incorporated into their lives. The

choice of topics, teaching methods, audiovisual material and handouts has been guided by the osteoporosis curriculum guide (Tresolini, et al., 1996). Most learners require the stimulation of multiple senses for learning to occur (Abruzzese, 1996). The more senses used for learning, the greater the retention of knowledge. In addition, a variety of learning strategies will also be applied. The principles of adult learning support the use of interactive learning, which in turn provides opportunities to explore the material, as well as apply and discuss new information. Small and large group discussion, lecture, outside assignments, case studies, audiovisuals, selected reading and self evaluation tools have been selected to meet the goals and challenges of adult learners.

Knowledge will be evaluated in several different ways. Pre-tests will be used in the first two sessions to determine basic knowledge about the topics. A post-test will be utilized in the same sessions to assess participants' increased knowledge about the specific topics. Knowledge will also be evaluated by participants completing a calcium intake questionnaire, a physical activity questionnaire, and an osteoporosis risk assessment questionnaire. These questionnaires are tools, which require the application of information that is provided in the current session or the previous session. Use of these types of learning activities are recommended by Tressolini et.al.(1996) This author developed three questionnaires for use in this health education module. The calcium intake questionnaire is based on National Osteoporosis Foundation

brochures and assessment tools, as well as on tables developed by Tresolini et al., (1996). The physical activity questionnaire is based on suggestions in Tresolini's Osteoporosis Curriculum guide (1996). Behavior change is difficult to evaluate over the short duration of this program and therefore the final assignment, "I Hearby Resolve", has been designed to assist participants to address the issue of behavior change. This is an evaluation method recommended by Silberman (1996).

A brief overview about organizational issues introduces the module (see Figure 3). A synopsis of key aspects of each session then follows. Expansion of these is included in the project's product in the Appendix. Each session will be scheduled, as a one time weekly meeting for three consecutive weeks because homework assignments require time to complete and this spacing will allow time and opportunities for participants to apply new knowledge and perceptions to their lives through the use of homework assignments. Examples of these assignments are (1) identify family or friends with osteoporosis, (2) look at examples in the media that conflict with healthy lifestyles.

Costs for this program include the purchase of materials like the National Osteoporosis Foundation video and slides, the handouts and the reproduction of handouts for class use. Currently the slide presentation is $75.00, the video is $15.00, and the NOF education packet is $40.00. Mailing costs for follow-up questionnaires, and time and expenses

Organizational Overview

For:	Use by APNs with a group of young adult women between the ages of 18-30 years.
Why:	To provide information on osteoporosis; risk factors for this disease; and information on prevention.
Content:	Includes the information for the instructional units in this health education module for use by APNs.
Time:	3 – 2 hour sessions
When:	Flexible, depending on opportunity within the community
Where:	Flexible, depending on site availability. Classroom or conference room.
Cost:	Expenses for presenting this education module will vary; cost to participants will be determined by the sponsoring organization.
Group Size:	Minimum of 5, Maximum of 20
Potential Sponsors:	Hospital based education service; public school system, local APN professional organization, community college outreach program, work based employee education program
Faculty:	Advanced practice nurses
Education Methods:	Use of audiovisuals, including video and slides, overheads, handouts, lecture format, small and large group discussion, homework assignments, and case studies.
Resources:	TV/VCR, projector and screen, overhead projector, copies of overhead information for participants, handouts

Figure 3 – Organizational Overview

for data collection and analysis will also be needed. These expenses will vary depending on the number of participants, price of postage and the time of the individual taking responsibility for these activities. Due to the proposed nature of this module and its target audience, space should be available through the education, workplace or clinical setting and thus not incur additional expense for rental of space, tables, chairs, etc. Audiovisual equipment needed include a TV/VCR unit and a slide projector with a screen. Again, this equipment is expected to be part of the building resources being used for the sessions. If not, rental fees will represent additional expense. An outline of Session 1 is provided in Figure 4.

Session 1

The goal for this session is to discuss basic information about osteoporosis, including the physiology of bone growth and development, the patho-physiology of osteoporosis and the risk factors for the development of this disease (see Figure 4). According to recommendations of Tresolini et al. (1996), women in this age group need basic information on bone anatomy and physiology, the development of adequate bone density, osteoporosis, the impact of this disease and risk factors for its development. Thus, education about osteoporosis begins with the development of a large core body of information. This can be accomplished through a variety of methods,

Session 1 (2 hours)

Goal: To discuss basic information about osteoporosis, including the physiology of bone growth and development, the patho-physiology of osteoporosis, and the risk factors for the development of the disease.

Objectives: the participant will be able to
1. Define osteoporosis on the post-test
2. Identify the general risk factors for the development of osteoporosis by applying this information in the class discussion.
3. Identify personal risk factors by completing a risk assessment appropriate for young adult females.

Outline:

I. Introduction
   A. Introduction of the facilitator
   B. Introduction of the topic
   C. Overview of the three sessions, including the program goals
   D. Introduction of participants
   E. Administration of the pre-test

II. Show "Prevent Osteoporosis Now", a video available from the National Osteoporosis Foundation.

III. Provide background information about osteoporosis
   A. Define osteoporosis
   B. Provide statistical information
   C. Discuss anatomy and physiology of bone growth
      1. Purpose and function
      2. Bone type and skeletal composition
      3. Bone growth
      4. Peak bone mass
      5. Factors influencing bone growth

IV. Discuss risk factors for the development of osteoporosis utilizing a combination of lecture and slides (available from NOF)

V. Administer risk assessment tool: Osteoporosis: Can It Happen To You?

VI. Give post-test and discuss: return pre-test and compare

VII. Assign homework for Session 2.

Figure 4- Session 1 Outline

including lectures, small and large group discussions, outside assignments and the use of audio-visual materials.

In the search of the literature, it was discovered that young women believe that it is unlikely that they will develop osteoporosis. In addition, this disease is considered to be less serious than other illnesses such as heart disease, breast cancer and AIDS (Kasper, et. al. 1994). Also, according to Klohn & Rogers (1991), it is the visible outcomes of osteoporosis that are most likely to persuade young women to change their beliefs about the risk of acquiring this disease. Also, according to Knowles' theory of adult learning, education for adults has to fit into a framework of 'needing to know' and assist the young adult to make a personal connection to the information. Consequently, the NOF video Prevent Osteoporosis Now (30 sec. 1998) is utilized to present this concept. This video is a dramatic representation featuring a young woman and what she could look like years later as a stooped over older woman with osteoporosis. A pre-/post-test and a personal risk assessment tool have been developed by this author to meet the needs of the young adult learner and to provide a means to open a discussion among the participants. These tests and tools are also a means for the APN to assess learning and to assist the participants to apply this information on a personal level. The pre/post-test (see Figure 5) is designed to sample knowledge of the basic information being

Directions: Session 1: Pre/Post-test (circle the correct answer) HINT: there can be more than one correct answer.

1.Osteoporosis is:

a. A disease of bones that leaves them weak and easily broken
a. A disease caused by eating the wrong foods
b. A rare bone disease that only happens to very old women
c. Is caused by arthritis

2.Risk factors for developing osteoporosis include;

a. Being female
b. Being male
c. Caucasian or Asian race
d. Being tall
e. None of the above

3.Osteoporosis is preventable?

True____
False____

4.If osteoporosis is preventable, I can prevent it by:

a. Doing weight bearing exercise
b. 'Watching my weight'
c. Drinking milk
d. Lifting weights
e. There is nothing I can do to prevent it. It just happens.

5.Once bones are grown, they do not change or grow any more.

True _____
False_____

6.Bones stop growing when we get as tall as are going to get.

True_____
False_____

Figure 5- Pre/Post-test for Session 1

provided in this session, including the definition of osteoporosis, risk factors, whether this disease is preventable and how this might be accomplished. The test is re-administered to measure change in participant's knowledge. In addition, an open-ended question is included in the post-test as a 'student recap' (Silberman, 1996); this is an opportunity for the participants to identify what they have learned. This is an effective way to get students to restate what they have learned. By inviting the participants to share, they can provide these insights to each other.

This author has designed a personal risk assessment tool (see Figure 6) specifically for this age group. Screening tools exist in the literature, but the questions are primarily designed to target pre-menopausal and post-menopausal women. Research has focused on risk assessment tools that can be used to screen for the presence of osteoporosis within a population (Kirkpatrick, Edwards & Finsh, 1991; McMahon, Peterson, Schilke, 1992; Perry, Andersson, & Mortimor, 1994). The purpose for the development of this risk assessment tool is educational, and therefore, it does not contain a weighted risk component. According to Kasper et al. (1994), young women do not perceive themselves as being at risk for osteoporosis. The questions in this risk assessment are directed at factors that many women share, regardless of age, as well as some that are more specific to this age group, i.e., the risk for anorexia and bulimia nervosa (American Psychiatric Association, 1994).

OSTEOPOROSIS: CAN IT HAPPEN TO YOU? ***

QUESTION	YES	NO
1. Do you have a small, thin frame?		
2. Are you Caucasion or Asian?		
3. Has a female member of your immediate family broken a bone as an adult?		
4. Is your diet low in dairy products and other sources of calcium?		
5. Are you physically active?		
6. Do you smoke cigarettes?		
7. Do you drink alcohol?		
8. Have you ever been diagnosed with anorexia or were you told you were anorexic?		
9. After your monthly menstrual cycles became regular, did you experience an extended period of time (months-years) when you didn't have a period?		

Figure 6- Osteoporosis Personal Risk Assessment

A homework assignment has been developed by this author to reinforce the participant's ability to identify the effects of osteoporosis on individuals that the participants know, especially older family members and family friends (see Figure 7). The discussion of this assignment in Session two will tie into the utilization of interactive learning experiences that allow adult learners to explore their personal experiences and connect them to the topic of osteoporosis. The NOF video, Prevent Osteoporosis Now, will provide a visualization that could sensitize young female adults to look at older female adults, with the physical signs of osteoporosis, with more awareness and recognition.

Session 2

The goal for the second session (see Figure 8) is to discuss strategies for the development of bone density and the possible prevention of osteoporosis. According to Tresolini et al. (1996), young women need information on diet and exercise, as well as other issues that affect bone health. The information in this session will be presented using a brief lecture format. The lecture format is a means to provide information in an organized fashion but has limitations when used exclusively (Silberman, 1996). Consequently, interactive assessment tools designed by this author will be used to stimulate and guide discussion. Use of these self-assessment tools on calcium intake and exercise are key to both the opportunity to stimulate general group discussion and to allow the adult learner to further identify present

Homework Assignment Session 1

A. Ask other family members about female or male relatives with fractures as adults (i.e. hip or wrist).
B. Is there any family history of someone with a diagnosis of osteoporosis?
C. Do you, or anyone else in your family, have knowledge of people with the signs and symptoms of osteoporosis, i.e., dowagers hump, fractured hip, etc. Think of people in your family, church members, family friends, co-workers, etc.

Figure 7- Homework assignment for Session 1

behaviors. The information on diet and exercise builds on the information from the previous session; it enhances the participants ability to move from the information on how bone density is developed to how osteoporosis can be prevented. Various dietary factors affect bone health throughout life. Calcium is identified as a primary nutrient in building and maintaining bone. Another important nutrient is vitamin D, which is required for the absorption and utilization of calcium. Other nutritional factors are important and nutritional needs vary at different stages of life, but the focus in Session 2 is on the consumption of adequate calcium and vitamin D for young female adults (Tresolini et al., 1996). The Calcium Intake Questionnaire (see Figure 9) was designed by this author to evaluate the consumption of common foods

Session 2 (2 hours)

Goal: To discuss strategies for the prevention of osteoporosis through life style modifications that will potentially increase an individuals' bone mineral density.

The participants will be able to:
1. Identify two behaviors that can influence bone density
2. Assess one's own life style and explore opportunities that might improve bone health by completing a physical activity questionnaire and a calcium intake questionnaire and participating in the discussion during this session.

Outline:
I. Introduction
   A. Review topic and objectives
   B. Opportunity to ask questions about previous material
   C. Discuss homework assignments and/or use case studies
   D. Administer the pre-test and collect
II. Discuss osteoporosis prevention
   A. Diet
   B. Activities
      1. Have participants complete the Calcium Intake Questionnaire
      2. Distribute the Calcium Content of Selected Foods handout
      3. Utilize this information to analyze participants calcium intake
      4. Discuss ways that participants can increase calcium in their diet, including alternatives to dairy products. Discuss beliefs about diet.
   C. Physical activity
      1. Describes weight bearing and resistance training exercise and tie it into the information on bone formation from Session1.
      2. Have participants brain storm or list exercises that fit into these two categories.
      3. Have participants list activities that they do during the day that involve weight bearing and muscle resistance that are not thought of as 'exercise'.
      4. Complete the Self-Assessment of Physical Activity Questionnaires.
   D. Other Life Style Issues
      1. Smoking
      2. Alcohol consumption
      3. Hormones
III. Administer the post test; return the pre-test
   A. Have participants compare their answers
   B. Have them jot down and idea or concept that was new, especially interesting to them or confusing and then utilize a "whip", quickly having each person state their observation or question. Discuss
IV. Assign homework for Session 2.

Figure 8- Session 2 Outline

Calcium Intake Questionnaire

***Estimate the number of servings of each of the following foods you eat during an average week.

8oz glasses of milk_____
Cartons of yogurt_____
Frozen yogurt or ice cream_____
1oz servings of cheese_____
Slices of pizza with cheese_____
Dark green leafy vegetables_____
Calcium-fortified orange juice_____
Cappuccino, café latte, or flavored steamed milk_____
Macaroni and cheese_____
Tofu _____
In addition:
Do you take vitamins? _____
Do they contain calcium? _____
If so, do you know how many milligrams?_____

Figure 9- Calcium Intake Questionnaire

that provide calcium. The assignment of computing the actual calcium content of these foods and comparing to the government daily calcium consumption recommendations allow the participants the opportunity to compare their current intake of calcium rich foods as well as to evaluate ways to increase their consumption of calcium. The role of vitamin D is included in this section.

According to Tresolini et al. (1996), it is important to encourage the establishment of a moderate, regular exercise regimen that includes both resistance and weight-bearing exercise for young adults. This author has developed the Physical Activity Questionnaire (see Figure 10). Its purpose is to assist the participants in looking at different

aspects of physical activity. How active have they been during their lives? What kinds of activities 'count' as 'physical activity'? This approach assists participants to identify ways to be physically active in everyday life, and how work and family responsibilities can contribute to being physically active. Information for the APN facilitator, on using these questionnaires, is incorporated in the agenda for Session 2 (see Appendix). As in Session 1, a pre-test and a post-test will be administered (see figures 11). These tests have been developed by this author to assess the participant's existing knowledge and learning. The 'student recap' method (Silberman, 1996), is included as part of the post-test. As previously discussed, the goal of this method is to have participants identify something personally significant that they have learned in this session. Sharing these insights can reinforce these insights and stimulate discussion within the group. Other lifestyle issues, including smoking, alcohol consumption and estrogen will be included in the lifestyle discussion because of the influence they can have on bone health. They are included in the Osteoporosis Risk Assessment Tool in Session 1 and this information will be reinforced by inclusion in Session 2.

A homework assignment for Session 2 (see Figure 12) provides the important transition into the third session, which focuses less on the dissemination of information and more on the exploration of behavior and the value placed by the young female adult on personal healthy

Physical Activity Questionnaire

• List physical activities that you have participated in during the following periods in your life.

5-10 years_____
11-16_____
17-21_____
22-30_____

• Have you ever participated in organized sports? _____

• If so, what sports and for how long? _____

_____

• How far and/or how often do you walk during the week? _____

• How do you spend your leisure time? _____

• Are you employed or have you ever been involved in activities that require you to lift or carry moderately heavy loads?

• List two activities that you do that you consider light exercise.

_____

• List two activities that you do that you consider moderate exercise.

_____

• List two activities that you do that you consider strenuous exercise._____

• I consider my self to be:

1) inactive, 2) moderately active, 3) very active

Figure 10- Physical Activity Questionnaire

Session #2 Pre/Post-test (Circle the correct answer) HINT: There can be more than one correct answer.

1. Our bones can continue to get stronger until the age of:
    a. 18 years
    b. 13 years
    c. 25 years
    d. 29 years
2. Exercises that increase bone strength are:
    a. walking
    b. riding a bicycle
    c. dancing
    d. swimming
    e. calisthenics
    f. weight lifting
3. Foods that are high in calcium are:
    a. dairy products (milk, cheese, yogurt)
    b. vegetables (squash, wax beans, asparagus)
    c. sardines
    d. fruit (bananas, pears, peaches)
4. I am getting enough calcium by having milk on my cereal each morning.
    True____
    False____

Figure 11- Pre-test for Session 2

Homework assignment Session 2

A. Find two examples of behaviors that are encouraged in the popular media that are in conflict with the prevention of osteoporosis through life style choices.

B. Find two examples of behaviors that are encouraged in popular media that are in harmony with life style choices that prevent osteoporosis.

**Examples can be found in magazine articles, advertisements, examples from favorite TV programs, etc.

Figure 12- Homework assignment for Session 2

behavior. By having participants look at the popular media, i.e., magazines, movies, etc., and examine how these mediums conflict with or support healthy behaviors, young female adults can evaluate their response to the culture in which they live. Combining these concepts with the information about osteoporosis and prevention meets all the components of Knowles' adult learning theory: the need to know, being responsible, accumulated experience, participation, internal motivation and barriers (see Figure 2).

Session 3

Tresolini et al. (1996) identify coping strategies and looking at ways of incorporating health behaviors into one's lifestyle as important to young adults. The goal of this session is to provide an opportunity for the participants to look at health behaviors, beliefs, values and our present culture (see Figure 13). The identification of barriers to healthy behavior and consideration of ways of dealing with the barriers that participants identify will complete this education module on osteoporosis. Barriers, internal motivation, the enhancement of self-concept, and empowerment are important when looking at the needs of adult learners (Knowles, 1990). The use of a 'whips' technique will be used in this session. This method has group members quickly respond to key questions. It is a useful way to stimulate discussion (Silberman, 1996). This exercise is a continuation of the homework assignment

Session 3 (2 hours)

Goal: To look at the effect of culture on our health beliefs and to identify barriers to choosing healthy behaviors.

Objectives:
The participants will be asked to:
1. Identify two behaviors that are potentially harmful to bone health.
2. Identify two behaviors that are potentially helpful in preventing the development of osteoporosis.
3. List two barriers that make it difficult to make healthy life style choices
4. Complete the "I Will Resolve" contract which focuses the individual on considering if and who they would apply what they have learned to their own life.

Outline:

I. Introduction
   A. Review of previous topics and objectives for today's session.
   B. Participants have an opportunity to raise questions.
II. Discuss homework assignment using the "Whips" technique.
III. Discuss the concept of barriers to behavior.
IV. Have participants make a list of health behaviors that promote bone health and that they believe that they value. Identify ways that they can fit these behaviors into their lives.
V. Have participants imagine future concerns that might present barriers to healthy behaviors (i.e. new job, starting a family, etc.) and imagine alternatives to these barriers.
VI. Provide a final opportunity for questions
VII. Have the participants complete the handout, "I Hearby Resolve", which is a personal note indicating what they have learned and what steps they plan to take to make healthy lifestyle choices, including barriers they have identified and how they might deal with these challenges.
VII. Administer a coarse evaluation with an opportunity to make suggestions for improvement.
IX. Inform the participants that they will receive a follow-up questionnaire 4-6 weeks after completing the series to see how they are doing and how they are using the information they have learned. They will have an additional opportuity to make suggestions about the module.

Figure 13- Session 3 Outline

utilized in Session 2. Students were asked to look at the popular media and ways that it affects behaviors. Since the primary focus of this session is to identify current barriers to healthy behaviors and to look at the value the individual places on these behaviors, the participants will have the opportunity to problem-solve through brain storming and verbalizing these issues to the group. This exercise should reveal how different individuals may approach the same problem. In addition, vignettes are utilized to present various situations and problems. Facilitator questions will direct the group members' discussion. These questions are designed to incorporate the information on osteoporosis from Sessions 1 and 2 or to look at ways to eliminate identified barriers presented in the vignettes. By looking at a variety of situations and circumstances, the stage is set for future growth and learning; by incorporating information from the earlier sessions, the knowledge is reinforced.

A final 'assignment' in this session is a technique described by Silberman (1996) in which participants write down what they are taking away from the class, what information they intend to use and how they plan to use it. The participants can choose to make a serious commitment to apply what they have learned and to specify how they plan to do this by writing it as a contract (see Figure 14). They can identify what healthy behaviors they value and how they plan to fit them into their life. This form can be sealed in an envelope to be opened at a

future date or placed where they would refer to it often. Returning to Lorig et al.(1996) recommendations for evaluation, the three areas to consider are (1) knowledge, (2) behavior and (3) attitudes and beliefs. Knowledge will be evaluated through the use of pre and post-tests and the assessment tools as well as class discussions.

In addition, knowledge, behavior and attitudes will be evaluated through the use of a follow up questionnaire that will be mailed to each participant 4-6 weeks after the completion of the program (see Figure 15). This evaluation questionnaire is based on evaluation questions suggested by Lorig et al. (1996), and this author's experiences with other general demographic information requests.

I HEARBY RESOLVE

1. Describe what you have learned from this health education module (be specific).

2. Describe a situation where you would choose to apply this information (be specific)

3. My plan to apply this information is (be specific).

(Modified from Silberman, 1996)

Figure 14- I Hearby Resolve

Osteoporosis Education Module Follow-up Questionnaire

Demographic Information:

Age_____

Race: Black_____ Asian_____ White, non-Hispanic____ Hispanic_____ Other_____

Marital status: Single____ Married ____ Divorced _____
Widowed_____

Number of children _____

Education level: Did not complete high school _____
High school graduation/GED_____
2-4 years college _____
Bachelors degree _____
> 4 years of college_____
Trade school_____

Class participation: From:_____ To:_____

Facilitator: _____

Class location: _____

Employment: Clerical_____
Management _____
Sales _____
Health care_____
Student _____
Manufacturing _____
Homemaker _____
Education _____

(continued on next page)

Directions: Circle all responses that represent your ideas and beliefs.

1. If I increase the amount of dairy products in my diet:
   - I will gain weight.
   - I will have more calcium in my diet, which is good for my bone health.
   - I don't need dairy products.
2. When you think of osteoporosis, I think of:
   - A rare disease that only a few old women get
   - An illness that is preventable
   - A disease that can cause pain, suffering and disfigurement
3. Physical Activity is:
   - Difficult to fit into a busy day
   - Consists of 30-40 minutes of intense sweating, and pain in order to 'count' as physical activity
   - Unpleasant
   - Includes many activities of daily living
4. Every day I:
   - Fit in physical activity that I know can strengthen my bones
   - Make sure I include calcium-rich foods in my diet.
   - Put off physical activity and eating calcium rich foods because I know I can catch up tomorrow.
5. Since I took the Osteoporosis Education Module:
   - I pay more attention to getting calcium in my diet.
   - I try to get physical activity in my day that contributes to strengthening my bones.
   - I feel that I can make changes in my life that can potentially prevent osteoporosis.
   - I don't do anything different than I did before
6. I would recommend that other young women participate in this program

   Yes _____ No_____
7. The length of this module was:

   Too short____ Too long___ Just right_____

8. More information should have been included on _____
9. Less information should have been included on _____
10. The most important information I learned was _____

    _____
11. Other suggestions I have are _____

    _____

Figure 15- Osteoporosis Health Education Module:
Follow-up Questionnaire

Implications

Osteoporosis has been identified as a major public health problem and the ramifications for health care in the future are enormous (Riggs & Melton, 1995; Yawn & Lydick, 1996; Khaltaev, 1996). Prevention is the only cost effective approach available, given the magnitude of this problem (Barrett-Connor, 1996; Riggs & Melton, 1996). APNs, by virtue of the range of settings in which they practice and their expertise in health promotion and illness prevention, are in the perfect position to provide education about osteoporosis and to provide support for lifestyle changes in young women. It is this focus and area of expertise that represent the unique and valuable contribution that APNs can make within the health care system. Three major areas of implications exist for this health education module on osteoporosis for young adult females: (a) education, (b) research, and (c) clinical practice.

Education

Three areas of discussion on the application of this module to education exist: (1) application to advanced practice nursing education and (2) application of this module in a variety of settings, and (3) the process of making this module available to other APNs for use in the community.

Advanced practice nursing education needs to include information on the prevention of osteoporosis as well as education on the diagnosis and treatment of the disease. This is especially true for APNs in

primary care roles in the community. In addition to prevention education, APN education should include information on the development and implementation of educational inservices, programs and modules. Knowledge about the use of educational theory, such as Knowles, could empower and guide APNs to develop and implement a variety of education programs in a variety of community settings. The APN, as clinician, educator, consultant, and change agent can initiate the implementation of preventive education programs, like this health education module on osteoporosis, in a variety of settings.

Nursing educators in BSN level programs could utilize this education module as a section on health education issues for nursing students. Application in this setting would reach a population at risk, young adult females, and also introduce potential future APNs to the advanced practice nurse role in a primary health promotion setting. The APN educator would be modeling a variety of roles and could use this module as an example of program development, an appropriate role for APNs.

Another community application of this module could be as a component of a sorority education series. Within college communities, the National Panhellenic Conference (NPC) sororities have stated a need for further programs in areas such as women's health ("Alpha Xi Delta," 1997). The presentation of this education module within the

sorority system would be reaching a population at risk, women between the ages of 18-22 years of age (Machiela, 1997).

Education on osteoporosis prevention would also be appropriate in work place settings. The APN could initiate an employer sponsored health initiative for women in the work place. Female employees of manufacturing, business, child-care and retail settings include women at risk for future disease who could benefit from health promotion education. Identifying employers willing to provide the time and resources for employee participation would be a potential barrier to the implementation of a health education program in the work place. The use of employer facilities at non-work times, i.e., lunch breaks or after work hours, would be a potential opportunity for the APN to provide health promotion information to the population of young female working adults. Additional sites for implementation include; (1) public school education programs that offer education modules that focus on pertinent health care issues, such as osteoporosis; and (2) hospital based out-reach programs that offer health education programs. As a change agent, the APN may become the catalyst for the creation of a program on bone health education and promotion in any of these settings.

The above are all examples of the application of an education module on osteoporosis in a variety of community settings. Because education modules of this nature are a possible "value added"

component of the presence of APNs in the health care system they could be advertised as such. Provision of health promotion and primary disease prevention programs is a major benefit of employing APNs within a health care system. Options for the presentation of this module for use by APNs would include presentation at local APN groups, statewide APN groups, and at MNA statewide conferences.

Research

This health education module on osteoporosis has not been implemented in any setting. Since this module seeks to influence, not only knowledge but also attitudes and behaviors, scientific knowledge will benefit from long-term evaluation of its influence on young adult women's attitudes and behaviors. Use of a follow-up questionnaire can help gather data on what interventions have been effective for participants in helping to increase their knowledge, as well as in changing their attitudes and behaviors. In addition, immediate feedback from participants should guide the APN on its effectiveness and possible modifications to the actual program, including organization, content, learning methods, assignments, and the use of audiovisuals.

This learning module on osteoporosis seeks to change behaviors. The behaviors requiring change to prevent osteoporosis are complex (diet and exercise). Self-efficacy is defined as a state of belief in one's ability to do something. Research has shown that we can change self-efficacy and that changes in self-efficacy are associated with changes in

behavior. By enhancing self-efficacy, improvement in behaviors, motivation and thinking patterns can occur (Lorig, et al., 1996).

Three mechanisms for enhancing self-efficacy are included in this education module: (1) skill mastery, (2) modeling, and (3) social persuasion. Skills include understanding how bone grows and how diet and exercise can influence this process, and then applying this information to a personal situation. Learning to evaluate calcium intake and exercise levels is another example of skills being taught in this module. Modeling of behaviors is done by the APN facilitator and by other class members. Social persuasion is found in the case studies, the NOF video, and the homework assignment for Session 1. Consequently, measures of self-efficacy and behavior outcomes could be made to assess the success of the module design. Positive outcomes in both reports of self-efficacy among participants and actual changes in health behaviors could potentially prevent osteoporosis, and increase the interest in designing and offering other health education modules.

A longitudinal, prospective randomized study looking at client participation and belief and behavior change over time would be an ideal evaluation for this education module. In addition, the design of this module with the use of Knowles' Adult Learning Theory could be tested using other topics in health promotion and disease prevention.

Several of the tools in this module have been in developed by this author and are untested. Feedback from participants and use with

different groups and populations will provide information to improve and increase sensitivity across age and cultural groups. Research questions that could be studied include whether the utilization of tools such as the Calcium Intake Questionnaire or the Physical Activity Questionnaire is effective in raising the awareness of the respondents. Cultural issues could also be explored. What items need to be included for racially diverse or socio-economically diverse populations? What is the ideal way to evaluate exercise and calcium intake in cultures that don't traditionally ingest dairy products or participate in 'exercise'? How could these tools be modified?

This module has been designed to address the learning needs of young adult females, but the risk of osteoporosis extends throughout the life-time of women. The overall design and specific elements of this module could also be modified and evaluated for use with other age groups of women. Tresolini et al. (1996) have included other recommendations for age specific information on osteoporosis prevention and could serve as an excellent resource for the modification of this module for application to other age groups.

Prior to the implementation of this health education module with clients, it would be valuable to present it to a select group of peers, educators and experts on osteoporosis for evaluation. Recommendations from this group would improve the value and quality of the module prior to its use with a client group.

Clinical Practice

Since this module is designed for use with a group, the APN in clinical practice could offer this module to patients in his/her practice population. Programs offered after the usual clinical hours could reach an at-risk population. Referrals from other providers within the practice and outside the practice would broaden the opportunities to reach individuals who could benefit.

Although this education module is designed for use in a group format, the individual components of the sessions, as well as the various content areas, can be used by the APN in the clinical setting with individual clients. Examples of this would include providing educational handouts on osteoporosis, exercise and diet, osteoporosis risk assessment, alcohol and smoking risks, and/or providing an opportunity to view the NOF video. APNs, regardless of setting, are focused on health promotion and disease prevention and thus the use of well designed and organized information can enhance their clinical practice. Screening of young females and providing information on their risk in all settings is important. It is the wide range of practice settings and the health promotion focus that make APNs ideal professionals to work with young females at a stage in their lives when prevention of osteoporosis is feasible and potentially effective.

Primary and secondary prevention of osteoporosis are the specific goals when working with young adult female clients. The development

of adequate bone mass prior to the point in life where bone loss naturally occurs can be thought of as 'putting money in the bank'. If there are adequate funds, retirement will be financially secure and the same is true with bone density. Clinically, therefore, components of this module on the prevention of osteoporosis could also be utilized with other populations and ages of women as a means to enhance secondary prevention by protecting and maintaining this bone bank balance. As APNs work with and utilize this education module, other uses and possibilities for other applications may occur.

Summary

Osteoporosis is recognized as a major public health problem facing aging individuals. Given the magnitude of the problem and the implication for health care in the future, the only cost-effective approach is prevention. Young adulthood is a potentially significant time to be reaching young adult females at risk of developing osteoporosis and to promote behavioral changes to positively affect bone density. According to the Healthy People 2000 National Health Promotion and Disease Prevention Objectives (U.S. Department of Health and Human services, 1991), osteoporosis is a multi-factorial, complex disorder and low calcium intake is one important factor. Females, particularly adolescent and young adult females should increase food sources of calcium. In addition to calcium intake, regular physical activity can help prevent osteoporosis. Thus, this scholarly

project focused on the development of an education module for young adult women. Prevention of osteoporosis can occur through the increase in BMD that is possible with adequate calcium consumption and physical activity. These factors are a major focus for this education module.

The framework for this module was Knowles' (1990) principles of the adult learners; these principles were applied to young adult females, the target audience. This framework treats adults as adults and is a developmentally sound approach to creating an education module for young adults; it supports the developmental tasks of young female adults by encouraging and stimulating self-concept, a sense responsibility, self-exploration of internal motivators, and identification of barriers that prevent growth and learning.

This module provides current information on the development of adequate BMD, risk factors for developing osteoporosis, assessment of current calcium intake and physical activity, and how to increase calcium intake and physical activity. The module also provides opportunities to evaluate life in our culture as well as opportunities for skills building, behavior modeling and social persuasion. These are all effective techniques for improving self-efficacy and consequently behavior (Lorig et al., 1996).

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APPENDIX

Health Education Module on Osteoporosis For Young Female Adults

For Use by APNs

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Health Education Module on Osteoporosis For Young Female Adults

Introduction

Osteoporosis is recognized as a major public health problem facing aging individuals. Given the magnitude of the problem and the implication for health care in the future, the only cost-effective approach is prevention. Young adult hood is a potentially significant time to be reaching young adult females at risk of developing osteoporosis and to promote behavioral changes to positively affect bone density. This health education module is designed for this population; it's primary goal is to increase knowledge about osteoporosis and risks for development of the disease. Individuals participating in this proposed program will have an opportunity to examine personal perceptions about osteoporosis and risk, prevention strategies, and lifestyle changes. Three, two hour sessions consisting of small group discussion, group interaction, outside assignments and/or case studies and implementation of learned skills are included with additional information for the APN facilitators.

The framework for this health education module is based on Knowles' theory of adult learning. Session 1 focuses on basic information about osteoporosis, including the physiology of bone development, the patho-physiology of osteoporosis and potential risk factors for the development of this disease. Session 2 discusses the prevention of osteoporosis through life style modification, including diet and exercise. Session 3 helps participants examine the effect of culture on health behaviors with the focus on identifying barriers to healthy behavior and ways to deal with these challenges.

Organizational Overview

For:	Use by APNs with a group of young adult women between the ages of 18-30 years.
Why:	To provide information on osteoporosis; risk factors for this disease; and information on prevention.
Content:	Includes the information for the instructional units in this health education module for use by APNs.
Time:	3 – 2 hour sessions
When:	Flexible, depending on opportunity within the community
Where:	Flexible, depending on site availability. Classroom or conference room.
Cost:	Expenses for presenting this education module will vary, Cost to participants will be determined by the sponsoring organization.
Group Size:	Minimum of 5, Maximum of 20
Potential Sponsors:	Hospital based education service; public school system, local APN professional organization, community college outreach program, work based employee education program
Faculty:	Advanced practice nurses
Education Methods:	Use of audiovisuals, including video and slides, overheads, handouts, lecture format, small and large group discussion, homework assignments, and case studies.
Resources:	TV/VCR, projector and screen, overhead projector, copies of overhead information for participants, handouts

Session 1 (2 hours)

Goal

The goal of this session is to discuss basic information about osteoporosis, including the physiology of bone growth and development, the patho-physiology of osteoporosis, and the risk factors for the development of this disease.

Objectives

Upon the completion of this session the participant will be able to:
1.Define osteoporosis on the post-test for this session.
2.Identify the risk factors for the development of osteoporosis by being able to apply this information in the class discussion and on the completion of the personal risk assessment tool.
3.Identify personal risk factors by completing a simple risk assessment appropriate for young adult females.

Content of Session 1

I. Introduction (15-20 minutes)
   A. Introduction of facilitator
   B. Introduction of the topic
   C. Overview of the three sessions including goals of the program
   D. Introduction of participants, inviting participants to identify specific goals or questions they would like to have answered during the coarse of the sessions.

II. Administer pre-test to assess participants present knowledge about osteoporosis and risk factors for the development of this disease (5- 10 minutes) Tests will be collected and then returned after completion of post-test for comparison.

III. Show " Prevent Osteoporosis Now" video from the National Osteoporosis Foundation with discussion (5-10 minutes)

IV. Provide background information about osteoporosis, bone growth, anatomy and physiology utilizing a lecture format with slides (30-40 minutes) **Slides are available through the National Osteoporosis Foundation (NOF).

   A. Definition- a potentially preventable chronic disease characterized by decreased bone mass and micro-architectural deterioration of bone, which leads to an increased susceptibility to bone fragility and increased risk to fracture (Ross, 1996, National Osteoporosis foundation 1998).
   B. Statistics
      1. Incidence: affects over 25 million Americans (Blalock, et al. 1996)
      2. Prevalence: Women: Men 6:1 (Blalock, et al. 1996)
      3. Cost: After age 65, 1.3 million fractures per year, at cost of $10 billion (Yawn & Lydick, 1996)

4. Risk: A woman's lifetime risk to suffer an osteoporotic fracture is greater than her combined risk for breast, ovarian and endometrial cancer (Yawn & Lydick, 1996).

B. Anatomy and Physiology of bone growth
   1. Purpose and function of bones
      - The skeletal system supports and protects the internal organs and allows the body to move.
      - Composed of 206 bones that are shaped according to their function and provide structure and protection
      - Bones are physiologically active, providing storage areas for minerals and a site for the formation of red blood cells (Barkauskas, V., Stollenberg-Allen, K., Baumann, L. C., Darling-Fisher, C., 1998).

   2. Type of bone and skeletal composition
      - Cortical (compact) bone makes up 80% of the skeleton. It forms the external surface of all bones and is found in the shafts of the long bones of the body. This type of bone provides the rigidity required for bearing weight.
      - Trabecular bone is a rigid meshwork of mineralized bone, which provides strength and elasticity.
      - Though trabecular bone is only present in 20% of bone tissue, it forms the greater part of each vertebral body and the epiphysis of the long bones (Renfro & Brown, 1998).

   3. How bone grows
      - There are three types of bone cells, osteoblasts, osteocytes and osteoclasts. The interactions of the different cell types controls the building up (formation) and breaking down (resporption) of bone tissue.
      - Osteoblasts produce a bone matrix, which becomes calcified once mineral deposition occurs. Once the osteoblasts are trapped in this mineral matrix, they change their function and become osteocytes. This permits the movement of minerals in and out of regions of the bone thus initiating the calcification process.
      - Osteoclasts are responsible for the breakdown of bone tissue (Renfro, J. & Brown, J. 1998).
   4. Peak bone mass
      - Peak bone mass is reached after the cessation of linear growth (height) for both men and women.
      - Under the influence of gonadal hormones (estrogen and testosterone), there is a rapid increase in skeletal growth during adolescence. During this growth phase, the skeleton is not architecturally mature and the skeleton continues to grow and

mature until maximum mass and strength is developed around the age of 29 (Renfro & Brown, 1998).

5. Factors influencing bone growth
    - Mechanical stress and strain on the bones as a result of muscle pressure has a bone-forming effect.
    - Bone adapts to the use to which it is submitted and therefore, more the muscles mechanically load the bones, the more the bones increase in volume and mass (Sinaki, 1989; Nelson, et al, 1994).
    - The process of bone formation and resorption is called remodeling.
    - The purpose of remodeling is to replace old bone with new bone.
    - Old bone develops microscopic fractures, requiring that the tissue be replaced
    - In the course of every adult year, 10%- 30% of the skeleton is replaced.
    - When extra bone is formed, a positive balance exists and when less bone is formed a negative balance exists.
    - The difference between bone formation and bone resorption determines whether bone is gained or lost.
    - Besides the actual physical load on the bone, the presence of calcium and the endocrine system influence is necessary for bone formation and growth (Renfro & Brown, 1998).

V. Risk factors for the development of osteoporosis (10 minutes)

A. Age

Osteoporosis is one of the most prevalent diseases of aging.
It affects more than 25 million people in the United States; 80% are women.
When a woman enters her fifth decade of life, she has a 40% chance of experiencing an osteoporotic fracture during her remaining lifetime (Turner, Fu, Taylor & Wang, 1998).

B. Race, Genetics, Body Composition, and Family history
- Caucasion and Asian women are at risk because they have an increased likelihood of developing low bone mass due to genetic factors which predispose them to lower body weight and smaller bone structure (Renfro and Brown (1998), Hodgson & Johnston, 1996).
- Women with low body weight and bone mass, regardless of race are at risk for the development of osteoporosis (Hodgeson & Johnston; Renfro & Brown).
- Young women whose mothers have a history of vertebral fractures also seem to have reduced bone mass and therefore an increased risk of developing this disease (Renfro & Brown,1998).

C. Lifestyle Risks
- Cigarette smoking

- Consuming too much alcohol
- Inadequate calcium and vitamin D intake,
- A sedentary lifestyle with little or no weight-bearing exercise (Renfro & Brown, 1998; NOF, 1994).

VI. Administer risk assessment Osteoporosis: Can It Happen To You? and discuss after it is completed (15 minutes)

VII. Administer Post-test and discuss (5-10 minutes) Use "Whip" technique by having each participant quickly state a point that they found interesting, new or confusing; return pre-test and compare answers.

VIII. Assign homework for Session 1(10-15 minutes)

APN Facilitator Information: This assignment is a form of active learning. It gives the participant an opportunity to experience first hand, in a real-life situation, the application of the topic and the content. It brings the information into the world outside of the classroom (Silberman, 1996). It will contribute to the accumulation of experience of the participants as well as to increase awareness and attention to experiences that the young adult actually has had.

Homework Assignment Session 1

A. Ask other family members about female or male relatives with fractures as adults (i.e. hip or wrist).
B. Is there any family history of someone with a diagnosis of osteoporosis?
C. Do you, or anyone else in your family, have knowledge of people with the signs and symptoms of osteoporosis (i.e. dowagers hump, fractured hip, etc.) Think of people in your family, church members, family friends, co-workers, etc.

Session 1: Pre-test/Post-test (circle the correct answer) HINT: Can have more than one correct answer

1. Osteoporosis is _____.
   a. A disease of bones that leaves them weak and easily broken
   b. A disease caused by eating the wrong foods
   c. A rare bone disease that only happens to very old women
   d. Is caused by arthritis

2. Risk factors for developing osteoporosis include;
   a. Being female
   b. Being male
   c. Caucasian or Asian race
   d. Being tall
   e. None of the above

3. Osteoporosis is preventable?
   True____
   False____

4. If it is preventable, what can we do to prevent it?
   a. Weight bearing exercise
   b. 'Watching our weight'
   c. Drinking milk
   d. Lifting weights
   e. There is nothing we can do to prevent it. It just happens.

5. Once our bones are grown, they do not change or grow any more.
   True _____
   False_____

6. Our bones stop growing when we get as tall as are going to get.
   True_____
   False_____

OSTEOPOROSIS: CAN IT HAPPEN TO YOU? ***

QUESTION	YES	NO
1. Do you have a small, thin frame?		
2. Are you Caucasion or Asian?		
3. Has a female member of your immediate family broken a bone as an adult?		
4. Is your diet low in dairy products and other sources of calcium?		
5. Are you physically active?		
6. Do you smoke cigarettes?		
7. Do you drink alcohol?		
8. Have you ever been diagnosed with anorexia or had people tell you they were worried that you were anorexic?		
9. Once your monthly menstrual cycles were regular, did you experience an extended period of time (months-years) where you didn't have a monthly period?		

Session 2 (2 hours)

Goals

The goal of this session is to discuss strategies for the prevention of osteoporosis through life style modifications that will potentially increase an individual's bone mineral density.

Objectives

Upon the completion of this session the participants will be able to:

1. Identify two behaviors that can influence bone density as evidenced by the correct completion of the post-test and participation in the discussions during this session.
2. Assess their own life style and explore opportunities they might have to improve their own bone health by completing both a physical activity and a calcium intake questionnaire and participating in the discussions during this session.

Content of Session 2

I. Introduction (20-30 minutes)

A. Review topic and objectives
B. Opportunity to raise questions
C. Discussion of homework assignment and /or use of case studies

II. Administer pre-test about present knowledge of osteoporosis prevention strategies and calcium intake

III. Discussion of osteoporosis prevention strategies (30-40minutes total)

A. Diet: (15-20 minutes)
   1. Bone consolidation continues in females after growth in height ceases. Therefore, an adequate supply of dietary calcium is necessary for calcium accumulation in the skeleton (Anderson, Rondano, & Holmes (1996).
   2. Calcium intake during the adolescent and young adult stages correlates highly with increased bone mineral density (BMD) of women in their 30's (Agostoni, Rottoli, Trojan & Riva, 1994).
   3. Vitamin D is necessary for calcium absorption and bone health. Vitamin D is the key that allows the calcium to be absorbed into the bloodstream. The recommended intake of Vitamin D for adults (18-50years) is 200 International Units (IU). The three ways to acquire vitamin D are 1) diet, 2) sunlight, and 3) supplements (NOF, 1998).
   4. Administer the calcium intake self assessment.
   5. After the participants have complete the self assessment, then hand out the calcium content reference on a variety of foods based on the NOF brochure (1998). Utilize this handout to compute the amount of calcium in the individual participants diet. Have participants compare

or add up the calcium content from their food list and compare to the recommended calcium intake for their age. Use these educational handouts to stimulate discussion on dietary habits, reasons for including or excluding dairy products from one's diet.

6. Discuss alternative sources to include adequate calcium in their diet.
7. Discuss participants beliefs about diet and ways of including calcium in the diet.

B. Physical Activity (15-20 minutes). Studies strongly support the view that regular exercise programs are effective in preventing or treating osteoporosis (15-20 minutes)
   1. Kinds of exercise- weight bearing and resistance training.
   2. Have participants brain storm or list exercise that they think would place in these categories.
   3. Have participants list activities that they do during the day that are not thought of as 'exercise' but involve weight bearing and muscle loading (i.e. gardening, chasing after children, grocery shopping, etc.)
   4. Discuss exercise choices in relationship to bone formation information from previous session- tie in the concept of using the muscles that put stress on the bones and make them dense.
   5. Administer the Self Assessment of exercise behaviors, past and present. After completing the physical activity questionnaire, use this tool to stimulate discussion about the participant's level of activity throughout their life. How did they view the activity they did as children, adolescents, now? Did they consider these activities as 'fun'? 'play'? 'exercise'? What kind of activities constitutes exercise? Walking? Gardening? Dancing? Skiing? Swimming? Cycling? Running/jogging?

IV. Other Life style issues (10-15 minutes)
   A. Smoking is bad for your bones because it reduces estrogen levels. Estrogen is protective of bone density (NOF, 1998).
   B. Alcohol consumption- 2-3 ounces of alcohol can be damaging to the skeleton. Those who drink heavily are more prone to bone loss and fractures, possibly through poor nutrition and increase risk of falling (NOF, 1998).
   C. Hormones-
      1. Young women who suffer from bulimia and anorexia may have amenorrhea (loss of regular menstrual periods) which can be a sign of decreases estrogen levels. This increases their risk for loss of bone density (Kushner, 1998).
      2. A protective effect of oral contraceptives has been demonstrated, although further research is needed (Recker,et.al, 1992).

V. Administer the Post test (10-15 minutes), complete post-test and then hand out pre-test.
   A. Have participants compare their pre and post-test answers.

B. Have them jot down an idea or concept that was very new or especially interesting to them and do a "whip" having each participant share their observation.

VI. Assign homework (5 minutes)

A. Find two examples of behaviors that are encouraged in the popular media that are in conflict with the prevention of osteoporosis through life style choices.
B. Find two examples of behaviors that are encouraged in popular media that are in harmony with life style choices that prevent osteoporosis.

*Examples could be magazine articles, advertisements, examples from favorite TV programs, etc.

Session 2 Pre/Post-test (circle the correct answer) HINT: There can be more than one correct answer

1. Our bones can continue to get stronger until the age of _____?
   a. 18 years
   b. 13 years
   c. 25 years
   d. 29 years
2. Exercises that increase bone strength are _____?
   a. walking
   b. riding a bicycle
   c. dancing
   d. swimming
   e. calisthenics
   f. weight lifting
3. Foods that are high in calcium are _____?
   a. dairy products (milk, cheese, yogurt)
   b. vegetables (squash, wax beans, asparagus)
   c. sardines
   d. fruit (bananas, pears, peaches)
4. I am getting enough calcium by having milk on my cereal each morning?
   True____
   False____

Calcium Intake Questionnaire

***Estimate the number of servings of each of the following foods you eat during an average week.

8oz glasses of milk_____

Cartons of yogurt_____

Frozen yogurt or ice cream_____

1oz servings of cheese_____

Slices of pizza with cheese_____

Dark green leafy vegetables_____

Calcium-fortified orange juice_____

Cappuccino, café latte, or flavored steamed milk_____

Macaroni and cheese_____

Tofu _____

In addition:

Do you take vitamins? _____

Do they contain calcium? _____

If so, do you know how many milligrams?_____

Calcium Content of Selected Foods

(Adapted from NOF, 1998)

Dairy	
Milk 8 oz.	290-300mg
Yogurt 8oz	240-415mg
Cheese 1 oz.	205-270mg
Cottage cheese (low fat) 4oz.	78 mg
Ricotta cheese (low fat) 4 oz.	335mg
Vanilla ice cream 8 oz	76-236mg
Non-dairy	
Calcium fortified orange juice 8oz	300mg
Salmon, canned (with bones) 30z	167mg
Sardines, canned (with bones) 3 0z	372 mg
Collard greens (cooked) 1 cup	357mg
Turnip greens (cooked) 1 cup	252 mg
Broccoli (cooked) 1 cup	100 mg
Calcium Fortified cereals ¾ cup	250 mg
Macaroni and cheese 1 cup	240mg
Cheese pizza (12 inch) ¼ pizza	280 mg
Tofu 4 oz * Calcium content depends on how it is made	*154mg

Daily Calcium Recommendations (mg/day)
(NOF, 1998)

1-3 years	500mg
4-8 years	800
9-18 years	1,300
19-50 years	1,000
>51 years	1,200
Pregnant or breast feeding	
<18 years	1,300
19-50 years	1,000

Physical Activity Questionnaire

- List physical activities that you have participated in during the following periods in your life.

  5-10 years_____

  11-16_____

  17-21_____

  22-30_____

- Have you ever participated in organized sports? _____
- If so, what sports and for how long? _____

_____

- How far and/or how often do you walk during the week? _____
- How do you spend your leisure time?_____
- Are you employed or have you ever been involved in activities that require you to lift or carry moderately heavy loads?
- List two activities that you do that you consider light exercise.

_____

- List two activities that you do that you consider moderate exercise.

_____

- List two activities that you do that you consider strenuous exercise._____

I consider my self to be: 1) inactive, 2) moderately active, 3) very active

(Circle the most appropriate choice)

Exercise for Healthy Bones

(Modified from the National Osteoporosis Pamphlet: Boning Up on Osteoporosis)

Exercise for healthy bones (1998).

1. Weight bearing exercise: walking, running, stair climbing, dancing and soccer (**swimming and bicycling are not weight bearing)

- **Weight-Bearing/ High Impact/ Resistance Activities:**

Stair climbing, hiking, dancing, jogging, downhill and cross-country skiing, aerobic dancing, volleyball, basketball, gymnastics, weight-lifting or resistance training.

- **Weight-Bearing/ Low Impact Activities:**

Walking, treadmill walking, cross-country ski machines, stair-step machines, rowing machines, water aerobics, deep-water walking, low impact aerobics.

- **Non-Weight Bearing/ Non-Impact Activities:**

Lap swimming, indoor cycling, stretching or flexibility exercises

2. Resistance exercise: weight lifting, free weights and weight machines

EXTRA! EXTRA! Hear All About IT!!!!!

Most weight bearing and resistance exercises place healthy demands on bone. Fortunately, daily activities and most sports involve a combination of both types of exercise. Thus, an active lifestyle filled with a variety of physical activity strengthens muscles and improves bone strength.

Four Principles of Exercise:

1. Frequency- Do weight bearing exercise at least 4x a week. Do resistance exercise 2-3x each week.

***HINTS: Walk to the store or to run errands, use the stairs, house and yard work count!**

2. Intensity- There is no gauge to measure adequate intensity for bone density. Resistance training must be increased over time and if a weight can be lifted 15 times in a row easily, it is too light to effectively stimulate bone development and increase in bone density.

3. Duration- The current total time recommended is 30 minutes per day, **BUT**...It doesn't have to be done all at once. It can be broken down into smaller segments of 10 minutes each.

4. Type- Choose activities that meet both goals, weight bearing and resistance training.

Session 3 (2 hours)

Goals

The goal of this session is to look at the effect of culture on our health behaviors and to identify barriers to choosing healthy behaviors that can potentially prevent the development of osteoporosis.

Objectives

Upon completion of this session the participants will be able to:

1. Identify two behaviors that are potentially harmful to bone health through participation in the group discussion.
2. Identify two behaviors that are potentially helpful in preventing the development of osteoporosis through participation in the group discussion.
3. List two barriers that make it difficult to make healthy life style choices in the final group project/discussion.
4. Participants will complete a "I Will Resolve" which focuses the person on considering if and how they would apply what they have learned to their life. This is a tool for them to take home and use as they choose.

Content of Session 3

I. Introduction (5-10 minutes)
   A. Review of previous topics and objectives
   B. Opportunity to raise questions

II. Discussion of the concept of barriers to behavior and alternative choices that are available (10 minutes).

III. Have participants make a list of healthy behaviors that promote bone health and that they believe they value. Identify ways that they can fit these behaviors into their current life style (10-15 minutes).

IV. Have them imagine future concerns that might present barriers to healthy behavior choices (i.e. new job, starting a family, etc.) and imagine alternatives to these barriers (20-30 minutes). Use case studies to supplement or augment ideas from participants.

   A. Case Study 1: Nancy G.

      Nancy G. is a 19-year-old college sophomore with an excellent record of academic and athletic performance during high school and college. She is 5'5" tall, and weighs 93#. She has been dieting and excludes dairy foods because 'they make her fat'. She is on the swim team and exercises 1 ½ - 2 hours every day. She hasn't had a regular period in three years, though she started menstruating when she was 12 and had established a regular monthly cycle at age 14.

1. What risk factors for osteoporosis are illustrated in this story?
   - Low body weight
   - Exclusion of dairy foods
   - Lack of regular menstruation ?? low estrogen levels

2. Can you think of social pressures or misconceptions that can contribute to young women being concerned about eating certain foods or of thinking that they are too fat??
   - Dairy foods are fattening
   - Pictures of very thin models in fashion magazines
   - Thin television and movie stars

B. Case Study 2: Ann B.

Ann is a 30-year-old woman who recently began work as a secretary for a building supply company. Her work is primarily done while sitting at her desk, but she does have to walk to other areas to deliver paperwork and she often walks to the nearby park to eat her lunch. She is married with two children and when she is not at work, she keeps very busy. She doesn't feel that she has time to exercise, but plays outside with her children when the weather is nice and she has time after household chores. On the weekends she likes to garden and do yard work.

1. Based on our information about exercise, what parts of this story demonstrate positive exercise behaviors?
   - Some walking at work and to the park
   - Playing with children and gardening

2. What parts of Ann's current lifestyle contribute to an increased risk for osteoporosis?
   - Primarily sitting at work
   - Limited time spent in physically active behaviors

3. How could Ann increase her physical activity to maintain bone strength?

C. Case Study 3: Marilyn S.

Marilyn is a 25-year-old woman and the mother of three children. The youngest is 10 months old and is still breast-feeding. Marilyn does not take time for exercise and finds it hard to prepare balanced meals for herself.

1. What would you advise Marilyn to help prevent osteoporosis?

- Including dairy products in her diet
- Negotiating with husband or finding babysitter to get some time for exercise
- Hiring a babysitter and go out dancing, etc. with husband.
- Taking the children for walks to the park and playing on the equipment with them.

2. What are the likely barriers to her achieving these prevention strategies and ways to work at reducing these barriers?

V. Final opportunity for questions from participants (5-10 minutes)

VI. Discuss the use of "I Hearby Resolve", a personal note indicating what they have learned and what steps they plan to take to use to make healthy lifestyle choices, including barriers that they have identified and how they might deal with these challenges (10 minutes)

VII. Administer a course evaluation with opportunity to make suggestions for improvement (5-10 minutes).

**Inform participants that they will receive a follow-up questionnaire 4-6 weeks after completion of the sessions to see how they are doing. Its purpose is to find out how they are using the information they have learned and to provide additional feedback on this education module.

Case Studies Session 3

Case Study 1.

Nancy G. is a 19-year-old college sophomore with an excellent record of academic and athletic performance during high school and college. She is 5'5" tall, and weighs 93#. She has been dieting and excludes dairy foods because 'they make her fat'. She is on the swim team and exercises 1 ½ - 2 hours every day. She hasn't had a regular period in three years, though she started menstruating when she was 12 and had established a regular monthly cycle at age 14.

1. What risk factors for osteoporosis are illustrated in this story?
2. Can you think of social pressures or misconceptions that can contribute to young women being concerned about eating certain foods or of thinking that they are too fat??

Case Study 2:

Ann B. is a 30-year-old woman who recently began work as a secretary for a building supply company. Her work is primarily done while sitting at her desk, but she does have to walk to other areas to deliver paperwork and she often walks to the nearby park to eat her lunch. She is married with two children and when she is not at work, she keeps very busy. She doesn't feel that she has time to exercise, but plays outside with her children when the weather is nice and she has time after household chores. On the weekends she likes to garden and do yard work.

1. Based on our information about exercise, what parts of this story demonstrate positive exercise behaviors?
2. What parts of Ann's current lifestyle contribute to an increased risk for osteoporosis?
3. How could Ann increase her physical activity to maintain bone strength?

Case Study 3

Marilyn S. is a 25-year-old woman and the mother of three children. The youngest is 10 months old and is still breast-feeding. Marilyn does not take time for exercise and finds it hard to prepare balanced meals for herself.

1. What would you advise Marilyn to help prevent osteoporosis?
2. What are the likely barriers to her achieving these prevention strategies and ways to work at reducing these barriers?

I HEARBY RESOLVE

(Modified from Silberman, 1996)

Directions:

Fill out the following form.

1. Describe what you have learned from this health education module

   a.

   b.

   c.

2. Describe a situation where you would choose to apply this information

   a.

   b.

   c.

3 My plan to apply this information is (be specific).

   a.

   b.

   c.

This form is for your personal use. Take it home and place it in a prominent place OR put in an envelope and open in 4-6 weeks and compare your health behavior choices with what you planned to do. Are they similar? Less? More? Do you want to re-evaluate?

Demographic Information

Age_____

Race: Black_____ Asian_____ White, non-Hispanic____ Hispanic_____ Other_____

Marital status: Single____ Married ____ Divorced _____ Widowed_____

Number of children _____

Education level:
Did not complete high school _____
High school graduation/GED_____
2-4 years college _____
Bachelors degree _____
> 4 years of college_____
Trade school_____

Class participation: From:_____ To:_____

Facilitator: _____

Class location: _____

Employment:
Clerical_____
Management _____
Sales _____
Health care_____
Student _____
Manufacturing _____
Homemaker _____
Education _____

Final Evaluation Form

Please complete this evaluation form and the personal information form that follows. The information you provide is important and will be used to assess this program.

	Strongly Agree				Strongly Disagree
1. The facilities were comfortable.	1	2	3	4	5
2. The facilitator was knowledgeable about the content and prepared to answer questions.	1	2	3	4	5
3. The information was clearly presented.	1	2	3	4	5
4. The objectives were clearly written and relevant to each session.	1	2	3	4	5
5. The handouts were helpful.	1	2	3	4	5
6. The homework assignments helpful.	1	2	3	4	5
7. The instructional methods were effective.	1	2	3	4	5

Based on my participation in this program, I am able to:

1. Define "osteoporosis".	1	2	3	4	5
2. Identify my personal risk factors for developing osteoporosis.	1	2	3	4	5
3. Identify two behaviors that can positively influence bone density.	1	2	3	4	5
Identify sources of dietary calcium and physical activities in my life.	1	2	3	4	5
Identify two behaviors that are harmful to my bone health.	1	2	3	4	5
Identify two barriers that make it difficult to make healthy life style choices.	1	2	3	4	5

Directions: Circle all responses that represent your ideas and beliefs.

1. If I increase the amount of dairy products in my diet:
   - I will gain weight.
   - I will have more calcium in my diet, which is good for my bone health.
   - I don't need dairy products.
2. When you think of osteoporosis, I think of:
   - A rare disease that only a few old women get
   - An illness that is preventable
   - A disease that can cause pain, suffering and disfigurement
3. Physical Activity is:
   - Difficult to fit into a busy day
   - Consists of 30-40 minutes of intense sweating, and pain in order to 'count' as physical activity
   - Unpleasant
   - Includes many activities of daily living
4. Every day I:
   - Fit in physical activity that I know can strengthen my bones
   - Make sure I include calcium-rich foods in my diet.
   - Put off physical activity and eating calcium rich foods because I know I can catch up tomorrow.
5. Since I took the Osteoporosis Education Module:
   - I pay more attention to getting calcium in my diet.
   - I try to get physical activity in my day that contributes to strengthening my bones.
   - I feel that I can make changes in my life that can potentially prevent osteoporosis.
   - I don't do anything different than I did before
6. I would recommend that other young women participate in this program

   Yes _____ No_____
7. The length of this module was:

   Too short____ Too long___ Just right_____

8. More information should have been included on _____
9. Less information should have been included on _____
10. The most important information I learned was _____

    _____
11. Other suggestions I have are _____

    _____

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